ABSTRACT

THESIS: Cardiopulmonary Exercise Test Responses to the BSU/Bruce Ramp Protocol

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Purpose: The purpose of this study was to evaluate known correlates of VO_{2max} including subject characteristics and exercise test data to develop an equation to estimate VO_{2max} for the BSU/Bruce Ramp protocol. **Methods:** 1913 cardiopulmonary exercise tests (CPX) were performed by adults aged 48 ± 13 years (range 18-82 years, 54% male). Linear regression analysis was performed to predict VO_{2max} using 946 CPX with the remaining 967 used for cross-validation. Exclusion criteria applied were RER <1.0, < 18 years old, abnormal test termination, and CPX from the same subject repeated within one month. **Results:** Total test time had the strongest correlation (r=0.82) with VO_{2max}. Two separate equations were developed to predict VO_{2max}. Total test time alone predicted VO_{2max} with a standard error of 5.5 $ml \cdot kg^{-1} \cdot min^{-1}$. Addition of age, gender, physical activity status, and body weight improved the prediction to account for 77% of the variance in VO_{2max} with a standard error of 4.6 $ml \cdot kg^{-1} \cdot min^{-1}$. **Conclusion:** Of the exercise testing variables examined, the same predictors as previous analysis of test time, age, gender, body weight, and activity status provided the strongest prediction of VO_{2max}. Additional variables of fat free mass and 1-minute heart rate recovery did not improve upon the prediction. Researchers and clinicians need to determine if the accuracy limits of ± 1 MET for predicted VO_{2max} are acceptable in clinical practice. When greater accuracy is required, measured VO_{2max} should be obtained.